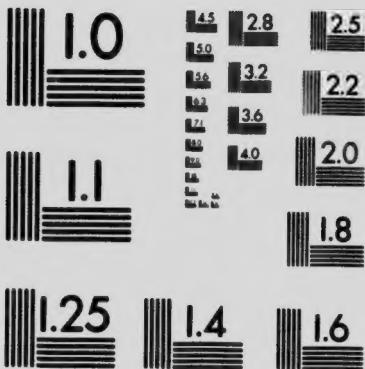




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Suggestions for
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WALTER P. TAYLOR

**SUGGESTIONS FOR ORNITHOLOGICAL WORK
IN CANADA**

By P. A. TAVERNER

Geological Survey, Ottawa.

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SUGGESTIONS FOR ORNITHOLOGICAL WORK IN CANADA*

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In surveying the results of ornithological work done in the Dominion to date, one is struck with the number of blank spaces in our knowledge, and the fine field yet offered for original research.

In the study of life-histories, there is hardly a species, amongst our Canadian forms, that has been comprehensively worked. Most of the work accomplished along these lines has been done in the adjoining republic and describes conditions a little slightly foreign to us zoologically as well as politically. Of course, our workers have been fewer both actually and proportionally in Canada than in the United States, and perhaps under the circumstances the broader generalizations that our few have accomplished has been of more pressing nature than the detailed surveys accomplished in the older community.

In geographical distribution our knowledge of Canadian avifauna is fragmentary and, if it were not for the results of work accomplished in the United States, would still be but an outline. The Maritime Provinces have been touched but locally. The Labrador and the Gulf of St. Lawrence has been worked intermittently. From Montreal west to the Toronto region but high spots have been touched; in fact, the southern peninsula of Ontario is perhaps the only area of any size in Canada, that has had anything like adequate attention from an ornithological standpoint. From a line east of Georgian bay to the Manitoba boundary we know practically nothing of bird conditions. Continuous systematic work in Manitoba ceased some years ago and the other Prairie Provinces—Saskatchewan and Alberta—have received but desultory attention from visiting naturalists. British Columbia is being investigated in spots but most of its area except locally in the southern portions is a *terra incognita* as far as exact ornithological knowledge is concerned.

In the northern region, on the Yukon river and some of its tributaries and main highways, considerable work has been done by occasional visitors. Along the route from Lake Athabasca

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to the mouth of the Mackenzie river various investigations have been conducted from time to time and, considering the accessibility of the locality, our records are comparatively full.

The Arctic coast of Coronation gulf has been, and is being studied. Of Hudson's bay and Ungava we have but scattered notes and short lists. Though considerable geographical exploration has been conducted by various parties amongst the islands of Franklin and the far north, our knowledge of the ornithological conditions there is fragmentary and imperfect.

In economic ornithology, Canada has done little if any original work.

In systematic science our working collections have been, and still are, too small to accomplish anything comparable to the work done on our own forms in the United States, even if we had our natural quota of trained zoologists to use such material to advantage.

Thus, it seems that ornithology in Canada still has most of its history before it, and outside of a few brilliant exceptions the work that should have been done by our own people has been accomplished by naturalists from the United States who have turned their attention in our direction.

The introduction of nature study in our schools and the general interest that has been awakened in allied subjects of late years has not, to date, entirely fulfilled the results expected of it. In fact, reliable observers of ornithological phenomena, both in Canada and the United States, are, perhaps, fewer to-day both numerically and in proportion to population than they were a generation ago. An elementary introduction to nature in our schools has failed to awaken any serious interest in natural problems. General and elevating interest in nature may be more widespread to-day but no ornithologist of marked ability has found his or her avocation or has been developed through these means. Whether this has been the fault of methods pursued, or causes more deep seated, the writer cannot tell. Certainly if, a generation or so ago, when the opportunities for learning even the rudiments of natural history were few and difficult to obtain, naturalists were developed at all, we should expect that to-day when the subjects are taught in every public school and the introduction to the study is almost forced upon large numbers of people, the percentage of serious and enthusiastic workers would be greater. These are the facts; the causes of the apparent failure must be left to pedagogs to argue over.

Does it not seem that Canada has reached that stage in its development where it can take its rightful position in the world as well along ornithological as in other lines?

For many years the Geological Survey of Canada has devoted what attention its limited staff could spare from its numerous other activities towards gathering Dominion ornithological data and there have been a few private investigators that have been observing and noting with commendable industry. With the broadening out of the work of the Geological Survey and its Museum, great impetus should be given to bird work in Canada. Museums are also being started or rejuvenated in the various provinces and the time seems ripe for a general wakening of interests in zoological subjects. To call attention to our shortcomings in data and workers it seems advisable to outline a few fruitful fields of endeavour that can be worked by various individuals whose tastes incline in that direction.

Ornithology can be approached and studied from various sides and by individuals of many different tastes and inclinations. For the general nature lover, interested in birds from a poetic or aesthetic standpoint, the study of life-histories offers a most attractive field. Careful watching and observing of feathered friends in their secluded haunts, bloodlessly stalking them with camera and note or sketch-book and divining the hidden secrets of their lives is a pleasure that can be indulged in by all and enjoyed by many. The most common bird of our vicinity is an object worthy of the most careful and painstaking attention. The Wren building in the improvised nesting box in the garden, the Song sparrow of the near-by thicket are both awaiting a careful record of the story of their daily lives. The amount of original, valuable and interesting information, that can be gathered from such homelike sources is almost infinite and unexpected surprises will almost daily repay the close observer. To those whose time and opportunities are limited such birds about home are fruitful. By those with more leisure, greater ambition or ampler opportunities work farther afield may be pursued and species less commonplace can be studied. In fact there is work in this line for everybody of widely divergent taste and situation and even city parks and backyard gardens will amply repay attention.

As a suggestion for investigation, the following outline of problems to be solved may be followed. It is merely suggestive and can be enlarged indefinitely.

Is the species a resident or a migrant?

When does it arrive and leave?

What are the determining influences upon its migrations,—food supply, weather, or does physiological development produce a periodical desire to migrate?

Which individuals come or leave first, male or female, young or old?

Are they mated when they arrive or do they select mates after arrival?

Are there any courtship ceremonies?

What characters seem to determine sexual selection? Vigor? Beauty? Song?

Do the same individuals return year after year to the same localities, and do they mate together annually?

How wide is the local range of the individual, do they keep close to this home area or wander widely?

When, where and how do they nest?

Which sex chooses the site?

Which sex builds the nest and how much and in what way do they aid each other?

What seems to be the qualities that they look for in selecting a nesting site?

Do they work on the construction throughout the day or only at regular intervals?

What is the technic of nest building?

Is the technic the result of instinct, experience or memory and does it improve with experience.

Are all individuals of the species equally expert in nest building?

How far can they adjust nest to new materials, situations or conditions?

Is there any change in the routine habits before, during or after nest building?

Are the eggs deposited immediately after the nest is finished?

What is the incubation period?

How many eggs are laid and when, how often, what is a normal set?

Does the egg laying seem under the conscious control of the individual?

What determines the number of eggs,—the size of the nest, the judgment, age or vigor of individual?

How are the eggs brooded, by which sex, do they divide the labor? Are the feathers removed from the abdomen of the brooding bird consciously or do they wear off by friction with the eggs? What is the incubation temperature? How often are the eggs turned by the parent?

How are the eggs protected during exceptionally inclement weather?

This list covers but a short time in the bird's life, but it shows how much can be learned and studied in but one phase of its existence; other moments in the lives of any species are equally interesting.

One of our greatest desiderata is an accurate investigation of distribution of bird life in the Dominion. The uninitiated rarely realize how many of the published ranges of our birds are based upon geographic probabilities, a *priori* reasoning or are copied and recopied, from previous writers. Examples are many. A great proportion of our southern Canadian lists give the Northern Hairy woodpecker as the common form and the Eastern Water thrush as ranging to the plains. The fact is, that the first is but a very rare winter visitor to the area, and Grinnell's Water thrush is the common form in the Lake Erie peninsula. Many more such cases could be cited. The only basis acceptable for such determinations are specimens examined by trained experts. Even when the forms are collected, comparison with series of specimens of allied forms is necessary to certainly establish its identity. In these we are woefully lacking and still have to depend upon the courtesy and interest of our friends across the line in the separation and substantiation of many difficult forms.

To establish the Canadian ranges of our birds, their migration routes and general status, we need skilled observers at all possible points, to note and collect local data and specimens. Ideally there should be an observer and collection in every county in the Dominion; each keeping track of his own area and comparing and checking it with results from adjoining stations. Provincial Museums should gather up these local details within their sphere of influence and the whole should be amalgamated and correlated by the Dominion authorities, represented by the zoological branch of the Geological Survey at Ottawa. In this way we would have co-operation and series of local collections illustrating intensive work throughout the Dominion.

All such work, however, to be of service must be based upon exact personal knowledge and substantiated in every way possible. We look back to-day upon apparent mistakes made by our predecessors, even those of marked and recognized ability, and wish for data by which to check their statements. The next generation will demand the same of us and with more reason for impatience, if it is absent. Ornithology has advanced and the necessity for substantiating everything is more generally recognized now than in the past.

(To be continued)

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The local worker, then, should collect industriously and determine his specimens with accuracy, getting expert opinion whenever necessary. The fact that no one can be equally familiar with all the recognizable forms of every species should be recognized and no hesitation shown in referring to those having greater experience in special directions. It should be the endeavour to study the bird life of the chosen locality thoroughly and no means should be neglected to extend an understanding of conditions in past times as well as present. For this purpose old literature pertaining to the locality should be searched and the accounts verified as far as possible. In fact the compiling of a bibliography of local application is an important line of research. The aim should be to tie up every record, when possible, with an extant and fully confirmed specimen, if not one in the observer's collection, its whereabouts should be noted so that it may be available for future examination and reconsideration. Examination of old collections of stuffed birds in out of the way places and old houses is a fruitful source of information, but the greatest care should be exercised in substantiating the data in connection with them. When there is any doubt whatever on this point the fact should be noted. In fact, to a local faunal list it is better to add a hypothetical list for all species whose occurrence cannot be substantiated by specimens or on equally unimpeachable evidence. A long hypothetical list is often an indication of careful work rather than the contrary.

In collecting, the local student should attempt to gather representative series of all the birds of his area, showing every possible plumage in which they occur in the locality. This means

more than single individuals or even pairs, nor is one only of each stage sufficient. Any single individual may be and usually is abnormal in some particular. It is only by a series of several that the average can be established. Freaks, albinos, melanos and other abnormal occurrences are of little general scientific interest, the normal is a much more desirable subject of study.

In gathering up information of specific occurrences the local taxidermist is a man to cultivate, not only to secure specimens but to learn and see what passes through his hands. It is well also to keep in touch with the shooting and sporting fraternity, for they often obtain material of great interest.

The desirable form in which to keep such collections is undoubtedly as dry skins and not stuffed and mounted specimens. The taste for the latter is waning for one thing, and they are otherwise too bulky to house and keep in any number. As the object is the indefinite preservation, the skin is much to be preferred, for the action of dust and light, to say nothing of insect ravages upon mounted specimens, is highly destructive and their life is limited. Besides this, a mounted specimen is not available for the handling necessary for close examination. One hesitates to maltreat a nicely mounted bird to get at hidden characters, that are easily seen in properly made skins.

A word here may be included as to the much vexed question of subspecies and how far it is desirable to recognize and study them. Originally, when the conception ruled that living forms were the result of special creation, a species was considered a fixed quantity, whose limits could be definitely placed. The acceptance of the evolutionary theory of the growth of species from others pre-existing necessitated a rearrangement of our ideas and it was found that what were regarded as permanent types were more or less unstable and that geographic variations occurred, extremes of which when compared without considering intermediate stages, exhibited differences of almost specific value. As all stages of differentiation between these extremes were to be found, it became evident that they must be regarded as evolutionary departures from the specific type and be, in fact, "species in the making," before the connecting sequence between them and the parent stock has been disrupted or broken down to form isolated species.

Our modern system of nomenclature gives each species a binomial name, one term representing the genus to which it belongs and the other the species. As it seemed desirable to apply definite cognomens to geographical variants from the typical form in order to facilitate referring to them, "give them a handle," as it were, a third name was added, making our system

a trinomial one and thus carrying out Linneaus' great invention in the spirit in which it was conceived. The result is logical and necessary, but it should be remembered that such geographical races, varieties, subspecies or whatever the student cares to call them are mere divisions of the species and the specific binomial is to be regarded as a collective name, including all the trinomial variants within its meaning. Thus a "Western Robin" is as much an "American Robin" as the "Eastern one" and the name *Planesticus migratorius* is equally applicable to any of the forms into which the "American Robin" divides. It is in fact only necessary to name subspecies either vernacularly or scientifically where special exactness is required by context or scope of consideration. In any event, it is wiser to ignore it altogether unless there is definite and accurate knowledge for justification. Subspecific designation should only be based upon examinations and authoritative determination of specimens, and not upon probabilities or assumptions.

In every subspecifically divided form there is one race that is called the "type form," loosely called the "species;" this is scientifically named by repeating the specific name in the trinomial; as, the Eastern Robin, *Planesticus migratorius migratorius*. Theoretically this should represent the original stock from which the variants departed but as these are often impossible to determine and scientific nomenclature must be exact, it means in practice that this form is the one that was first discovered or described and to which, by the canons of nomenclature, the name must permanently adhere. The type race then, is really of no more scientific importance than its co-races.

The realization of the proper relative importance between type and subspecific forms and the applications of sane principles in practice will go far towards rectifying the abuses from which a valuable system has suffered.

Some subspecies are marked and conspicuous in character; but as there must be species in all stages of making, some exhibit but minute differences only evident from the examination of series of comparable material by trained perception and judgment.

Theoretically, the numbers of subspecies of a widely varying race must be innumerable, but the most of them are too fine for human recognition. The question is, of course, where to draw the line. Subspecies are actual facts and do exist. Whether it is serving the best interests of science to deferentiate and name the finer variations that only an expert, especially trained, can recognize is a subject, that is still being argued. However, whether we hold with the "Splitters" or the "Lumpers" it

seems best for the majority of us to follow the lead, perhaps under protest, of the consensus of representative opinion as evidenced by our American Ornithological Union Check List, though we can reserve to ourselves the liberty of departing from their findings in cases where mature judgment or data justifies it. However, for the sake of uniformity it is better to err on the conventional rather than the radical side and to keep as largely as possible in harmony with accepted contemporary authorities.

Others, to the contrary, notwithstanding no enduring faunal work, can be accomplished without the collection of specimens. The field-glass and camera are most valuable auxiliaries, but cannot altogether take the place of a bird in the hand. Due regard must, however, be given to the principles of humanity. Collecting is a necessary evil to scientific study and is amply justified by it, but the responsibility of the collector is great and his influence should be always thrown against the useless killing of anything. The collector kills for a good and sufficient reason and should never do it, without that justification. Man, who has been given or has assumed the rights of the earth, should recognize his responsibilities and bear the relation of a guardian to harmless lower life. Our laws recognize this and it is necessary for a collector to get a permit from the game warden of his province. This, however, is issued to duly qualified students who should be careful that the privilege is not abused. Nothing should be killed without a good and sufficient reason and when so killed particular care should be exercised that the best use possible is made of it and that it is preserved for all times.

The privilege to collect specimens, the legal property of the people, is granted by the representatives of the people for the benefit and increase of knowledge of the people. Hence such specimens are in a manner public trusts and when once taken should be preserved as such and not for individual gain or hoarding. They should be kept as safely from damage by time, dust, light, insects or accident as circumstances permit and, as the owner has morally but a life interest in them, arrangements should be perfected, so they may be for the present available for study by other workers and finally deposited in some known repository where they will be available to coming generations of investigators.

The fear that the legitimate collector will deplete our bird life is groundless. Even were the number of our collectors increased many times and stimulated to greatly increased energy they would have a negligible effect. Large collections are sometimes pointed to as causes of a supposed reduction in bird life but all the collections in North America, the results of fifty years'

industrious work, would not nearly equal the destruction caused in one year by millinery plumage hunters. When we consider the constant, widespread persecution and the number of widely distributed sportsmen it has taken to reduce our game birds, it is obvious that a few scattered collectors can have little, if any, influence upon the bird population. The ideal conditions suggested before, call for a collector in every county. If we had but one dozen sportsmen shooters in every county would game be scarce to-day?

There is also a sentiment against the scientist collecting "rare birds" on the supposition that if these were allowed to breed they would become common. There are practically no birds, but game, raptorial and plumage forms, that suffer systematic persecution. The number of small or rare birds that are killed by human agencies, except for profit or food, is on the average negligible. Are there a dozen people in Canada, seeking or hunting for Cory's Least Bittern? How many would know one if they saw it? The species has had hundreds of generations in which to become common, if they are rare now it is due to the action of still operating natural causes. The rarity of a creature not especially or generally hunted for profit is an indication that it is not adapted to conditions and is nearing extinction through natural causes. Rarity obviously just precedes extinction.

Of course with species that are much hunted, or that are rare, owing to the geographical limitations of the habitable or breeding ranges, the question is different. Scientific collectors have occasionally gone into small, isolated colonies and practically wiped out a species that, but for them, might have survived for a while longer. But even in these cases the fact of such limited range itself indicates that the species is declining and its end has been only hastened. A dominant, virile race will tend continually to spread; that it has not done so, it is an indication of inherent weakness in the species.

The Passenger Pigeon is often pointed out as an example of man's ruthlessness, and a great deal of sentimentality has been exercised over it. In the first place, great flocks of birds of this species would to-day be incompatible with agricultural pursuits. If man destroyed the Passenger Pigeon it was by extensive netting operations against them and not by the desultory shooting of scattered farmers and sportsmen. Yet the last year of netting at the Petosky rookeries left countless pigeons alive. The fact that few of these returned the next spring was no fault of the trappers. For years thereafter occasional flocks and bunches of Passenger Pigeons were seen;

Special protection might well have secured its preservation however, and this argument of Townsend's, logically extended, could be made to defend the extermination of any species whatever.

enough to have stocked the continent, at any rate to the limit of economic safety, had they been adapted to present conditions. The Bluebird population was almost entirely wiped out one winter. Fewer were left of them than of pigeons just after the Petosky rookery was deserted; yet in five years the Bluebird regained its old numbers. But the Bluebird is a strong, virile race, suitably adapted to the conditions of a cultivated country. The pigeon was not; hence it passed away while its close relative, the Morning Dove, still thrives and increases. *Soose*

It must be borne in mind that our bird population is limited by natural conditions. In most cases this limit was reached long ago, and no more birds can inhabit North America than can find support during the season of least food supply. In a normal or stationary population, the death rate must equal the birth rate or else the population ceases to be stationary. The breeding season increases the population enormously and one way or another this increase must be, and is, reduced to the smaller supporting power of the land through winter.

It is evident that this allows of a considerable margin of reduction and shows that even quite considerable numbers can be destroyed without interfering with the ultimate numbers of the population and that the comparatively few individuals taken by collectors cannot have an appreciable effect upon their number.

The professional collector has come in for popular abuse, far beyond his deserts. In the first place, the professional collector is almost an unknown quantity. He is too scarce in fact to find when wanted. In the next place, there is little or no market for his wares. Few scientists are wealthy or able to pay prices that allow the professional a livelihood. The trade in big game heads and trophies with wealthy sportsmen is considerable and the plumage business for millinery purposes has wrought devastation amongst certain species but the opportunities for professional scientific collectors are small indeed. This is to be regretted as, allowing that the study of birds is justifiable, it follows, as a matter of course, that the man who supplies the material is justified also and is engaged in commendable work. No one person can personally gather material from everywhere, yet extra-limital material is just what the serious investigator requires in his work. Without a system whereby the earnest student can, at least partially, pay the expenses of his explorations, modern science would still be in the dark condition of middle ages. The epoch making field works of Bates or Wallace would have been impossible if they had not found a market for their wares.

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leaves

To hope that each of our counties will have facilities for the proper and safe storage for such valuable objects is perhaps to wish for the millennium. However, many of the provinces are establishing museums, that should develop into just such repositories for provincial data and we hope the time is not distant when this use of them will be more highly and scientifically developed. In the meantime we have a Dominion Museum, that is prepared not only to store but to scientifically use such material and is slowly building up a national collection for future Canadian students in proportion with the growing dignity of the country it represents. It is to be hoped that the time will come when it will take equal rank with other national museums of the world, the British Museum, the Smithsonian Institute and others of like repute. To do so, however, requires the co-operation and sympathy of the Canadian people as a whole. No public institution can do all the necessary work itself but must rely largely in the building up of its collections and prestige upon the interest and aid of the people it represents. Thus grew the great British Museum through the practical help of its private friends into an institution that is an imperial pride. On this side of the water the scientific and enthusiastic generosity of such men as Roosevelt, Abbot and others who donate large collections resulting from their sporting expeditions at home and in various parts of the world to the public good, as represented by their national institutions, has gone far to place the Smithsonian Institution well into the forefront of scientific progress. Our people should be no less interested in the advancement of our institutions than those abroad are to theirs. The government alone can never raise its museums to a commanding position in the world; the people in their private character as individuals only can bring about that consummation and with them the future of zoological science rests in Canada, as well as elsewhere.

On the economic side of ornithology much work remains to be done. So far we have been content to draw from the results of the United States Biological Survey and other workers across the international boundary. In so far as they treat of our species, their problems are our problems and it is questionable whether we want to duplicate their work. They have already developed an elaborate technical staff of specialists and special facilities besides gathering an immense amount of material and data. We could not compete with their efficiency for many years. It seems, except in the case of special problems of peculiar Canadian interest, we can do better by leaving the bulk of such investigation to them, co-operating when possible

and helping when we can, secure in the knowledge that any results arrived at in Washington are applicable here and available for our use. In the meantime we will have our hands and time free for other original work and avoid unnecessary and wasteful duplication.

Systematic zoology is pre-eminently the work of the closet naturalist and though to the laity it is the proverbial dry-as-dust work of the naturalist of caricature it ultimately underlies our whole modern conception of life. The tracing out of the relationships of species is our means of retracing the chain of life back through the ages to its beginnings. The conditions under which development arises gives us clues by which we are beginning to understand the fundamental principles of living creation. It is work, however, for the specially trained and can only be successfully engaged in after considerable experiences and preparatory study. In the ornithological field, so far, Canada has been too busy with practical development to give much attention to this field of endeavour. For the present, therefore, we cannot hope to seriously compete with older countries who have already trained their staffs and where collections represent material in series such as ours do not as yet contain.

However, we can all do our mite towards preparing the country for future work and future needs, gather data and specimens and gradually train a scientific body competent to attack the "riddles of existence" from the ornithological side as well as from other directions. We are all searching for the truth, the biologist, the geologist, the physicist, the chemist and the astronomer. Far apart as we seem to be in our work, we are all attacking the one great question from different directions. The answer to an astronomical detail is often found by the geologist or the chemist and the geologist receives illumination from the physicist and the biologist.

It is not an overstatement to say that zoology has had more to do with the development of modern thought in its various branches than any other science. The enunciation of the evolutionary theory had a more fundamental effect upon current thought and conception of life than anything that ever went before it. Ornithology is a branch of biology and has done its honorable share in making the intellectual world what it is to-day. If we, as ornithologists labor and do our work conscientiously, with due appreciation of our responsibilities both to science and to mankind, we can shed the light of our individual tapers in some of the dark places and add our quota to the general enlightenment. In the foregoing I have attempted to outline or indicate a course for such work.